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REVIEW: ECONOMIC VALUATION TECHNIQUES FOR CONSERVATION OF NATURAL RESOURCES AND WATERSHED MANAGEMENT

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ABSTRACT

One of the objectives of conservation of natural resources is to strive for environmental sustainability for the benefit of the entire community. Achieving this goal means maximizing the total economic value of a conservation area, not just financial acceptance. Natural and environmental resources have usable values that can be calculated using traditional calculation methods, indirect use values, future value and non-consumer benefits. Economic valuation techniques to determine the economic value of an area, is done by calculating the reception, the calculation of non-acceptance, market-based techniques, techniques based on cost, engineering cost of the trip, the contingent valuation method.

KEYWORDS: Conservation of natural resources is the efficient use.

INTRODUCTION

Conservation of natural resources is the efficient use of natural resources and treat based on natural law. Conservation is an effort or action to maintain the existence of something continuously and continuously, both quality and quantity.[1]

Natural resources are part of the ecosystem, the venue for the environment reciprocal reaction between the living and natural factors. Therefore, the utilization of natural resources in essentially make changes in the ecosystem, so that planning the use of natural resources in the framework of the development process can not be reviewed separately, but always done in relation to the ecosystems that support it. Natural resources in addition to producing goods and services that can be consumed, also produce environmental services that provide other benefits, such as the benefits of beauty, and recreation. Given the importance of the benefits of natural resources, then these benefits need to be assessed. Therefore, according to[2], the output generated from the management of natural resources and environmental goods and services, need to be given a price tag.

According to[3], there are three types of assessment approaches a natural ecosystem that is impact analysis, partial and total valuation analysis. Approach impact analysis conducted if the economics of ecosystems views of the impact that may arise as a result of a particular activity, for example as a result of the reclamation to coastal ecosystems. The partial analysis approach is done by defining two or more alternative ecosystem utilization options. Meanwhile, the total valuation approach is conducted to estimate the total economic contribution of a particular ecosystem to the community.

The basic concept of valuation refers to the contribution of a commodity to achieving a particular goal. In the context of ecology, a high value if the gene is able to contribute to the survival rate of individuals who have the gene. In the view of ecological economics, values are not only for the maximization of individual welfare but also related to ecological sustainability and distribution justice.[4] In the economic context, valuation is an effort to provide quantitative value to goods and services produced by natural resources and environment, both on market value and non market value. Economic valuation of resources is an economic tool that uses certain valuation techniques to estimate the value of money from goods and services produced by natural resources and the environment.

An understanding of the concept of economic valuation allows the decision makers to determine the use of

natural resources and environment of effective and efficient. This is due to the application of economic valuation shows the relationship between the conservation of natural resources with economic development. Thus, the economic valuation of the environment in the context of community preference measurement of environmental good than bad for the environment.[2]

Watershed management is conducted to regulate the interrelationships between natural resources in watersheds and humans in order to realize ecosystem sustainability and ensure the sustainability of the benefits of these natural resources for humans. The guarantee for the sustainability of the watershed can be achieved if each management activity is run on sustainability principles that integrate the balance between productivity and conservation to achieve watershed management objectives, namely: (1) improving water stability, (2) improving soil stability, including controlling process of land degradation, (3) increasing farmer's income, and (4) increasing community behavior toward conservation activities that control flood and surface flows.[5]

Broadly speaking, the watershed system can be divided into three parts, namely the upstream, midstream, and downstream. Ecosystem watershed is very important in the system upstream watershed protection because it serves as the water system as a whole watershed. Upstream areas are characterized as rural ecosystems with four main components: village, rice field, river, and forest. Thus, the upstream watershed management is not just to keep the water function watersheds, but also must be able to improve livelihoods and boost the economy of local communities in a sustainable manner.[6] The balance between the needs of local communities and the preservation of natural resources, is a prerequisite for the achievement of the management objectives of sustainable watershed.[7]

To support the watershed management objectives, as mandated in Law no. 41 of 1999 on Forestry and Law no. 26 of 2007 on Spatial Planning, at least 30% of watershed areas should be forest areas with a proportional distribution. That is, the upstream area that serves to provide protection of the area beneath it and the boundary area of the river should be a forest area (Presidential Decree No.32 of 1990). But in reality, in Indonesia's watersheds, especially in Java, upland and river borders have become private property rights and turned into agricultural land. To restore the area according to its function as a forest area is difficult to do. Watershed management in Indonesia has not been able to meet sustainable watershed management objectives. From year to year the number of watersheds that experience environmental degradation and natural resources is increasing. Increased damage to watersheds is seen in the addition of the number of watersheds that become priorities.

The degradation of the watershed environment is mainly due to: (1) inappropriate land use planning and practices, (2) increasing population growth, (3) poverty and economic downturn, (4) less supportive policies, (5) protection and regulatory policies do not restrict land ownership and use, and (6) uncertainty over the use of land rights in forest land.[8]

The degradation of the watershed is triggered by sectoral conventional management, not integrated from upstream to downstream and top down which emphasizes command and control, both at the policy, operational, and implementation level.[9] The failure of watershed management with the conventional approach encourages the government to adopt a new approach emphasizing socio-economic and environmental balance. This paradigm shift prioritizes the more participatory integrated watershed management by involving local communities in watershed management processes. Government Regulation No. 37 of 2012 on Watershed Management already includes community participation and empowerment in watershed management. Nevertheless, the community's role mandated in the regulation is still at the stage of providing input and aspirations, suggestions and considerations, as well as overseeing watershed management.

Based on the above, economic valuation techniques for conservation of natural resources and watershed management are required.

Management of Conservation Area and Economic Value

[10] and [11] states that natural and environmental resources have direct use value that can be calculated using traditional calculation methods, indirect use values, future value and non-consumer benefits. In terms of conservation areas, direct use value includes food produced in the form of marine products or forest and recreational benefits. These benefits is calculated as the benefits derived from the conservation area, for example, entrance fees, and non-forest products harvested forest, and the cost of lost opportunity, such as the loss of mining or resource rights in economics is often referred to as the opportunity cost.

Actually there are many benefits of other protected areas that can not be calculated by using traditional methods. The benefit is an indirect use value that consists of the functional benefits of an ecological process that continuously provides a role to the community and its surrounding ecosystem. For example, the highland forests intact continuously provide flood control protection, as well as the role of coastal mangrove forests that maintain the sustainability of fisheries resources. Ecological processes also provide global benefits, as tropical forests can absorb carbon oxides and control climate change. The market mechanism does not reflect the values of the non-consumptive use them. However, this indirect use value clearly shows that there is a clear

link between conservation and national, regional and local economic development.

The use value of a conservation area encourages additional direct benefits through a multiplier effect process. For example, the money incurred by a visitor at an ecotourism inn encourages the inclusion of expenditures in a particular area, as local food vendors and farmers work together in the supply of food for the lodging business. However, the lodging business has also pushed costs, such as increased waste water, which has substantially reduced the net profit it earns. Therefore, we need to see the economic benefits and costs of a conservation area.[12]

Conservation areas also contain costs in the form of public or state losses due to loss of access to resources in their area. In general, these costs include loss of utilization rights on timber, non-timber forest products, mining, agricultural land, residential areas, industrial land, waste disposal, fisheries, export commodities, and tourism.

Identifying Appropriate Valuation Method

The selection of appropriate methods requires the involvement of many parties, especially to test the method through several different approaches. There needs to be an effort to develop innovative approaches as part of a structured and repetitive learning process. The process should also be accompanied by a review of technical aspects of legal, political and procedural aspects.

There are various methods that can be used for environmental valuation, and these methods have become the focus in academic and political debates.[13] Nevertheless, the lack of similarity in the context and institutions in Indonesia creates some uncertainty and leads to reluctance to use valuations in trials. In addition, the process of selecting and identifying methods and natural resource valuation approaches also requires an attempt to clarify what definitions of benefits will be assessed through the collection of best practices from multiple sources and ensuring that these efforts must remain realistic.

Economic Valuation Technique

One goal of conservation is to strive for environmental sustainability for the benefit of the entire community. Achieving this goal means maximizing the total economic value of a conservation area, not just financial acceptance. More focused attention to maximizing revenue alone means meeting short-term needs for the sake of economic growth.

In the management of natural and environmental resources, policy makers depend on a number of economic valuation techniques to determine the economic value of an area beginning with the calculation of financial revenues derived by a particular region. After that just switch to economic valuation in order to get the economic value indirectly from a conservation area. By having complete information, policymakers can prioritize areas for conservation and determine the costs required for their management activities.

According to[14] and,[12] the economic valuation technique for determining the economic value of an area is done by:

- Calculation of revenue. Conservation areas generate significant revenue from levies to visitors, financial obligations to be paid by concessionaires and collectors of non-timber forest products. The data is relatively easy to obtain by policymakers, but the data only describes initial estimates of the economic value of conservation areas.
- Non-acceptance calculation. The practical challenge in implementing the economic valuation study is to derive a reliable estimate of the biological resources either in the context of market prices or imperfect markets. Some of the benefits of conservation areas are relatively concrete, such as the benefits of water flow protection. However, other benefits such as the value of existence are quite abstract.
- Techniques based on the market. This technique uses actual market prices as prices that are considered to be close to the value of environmental goods and services produced by conservation areas. For example, local people do not pay for the firewood they collect from a conservation area. A simple technique for determining the value of firewood is to compare it with the price of firewood products sold in the local market. The principle of this method is the basis for determining the economic value of the area from the production and public health.
- Technique based on cost. This technique calculates the opportunity costs of the conservation area (costs/losses suffered by communities due to loss of access to the utilization of resources and the environment within the conservation area) and the costs incurred to maintain goods and services naturally contributed by conservation areas.
- Travel costing techniques. This technique determines the recreational value of the conservation area by seeing willingness to pay the visitors. This technique shows that the value of the conservation area is not only from the admission ticket, but also consider the cost incurred by visitors to the conservation area location and the loss of their potential income due to the time spent on the visit.
- The contingent valuation method. This technique is used when there is no market relevant to environmental goods and services. This technique builds market variables that directly ask individuals about their willingness to pay for the environmental goods and services they have acquired and their willingness to receive compensation if they can no longer be utilized.

Types of Environmental Values

A set of goods, services and these values are interwoven to form a socio-ecological systems are complex, such as the provision of the benefits that are usually tied to other benefits. It highlights the importance of a broad approach in environmental valuation to considering the many different values across landscapes, and how it provides collectively goods and services that are valued by the community. According to,[15] environmental valuation identified a number of diverse and complex value that can be conceptualized in various ways, among others:

- Direct use value: resources for extraction, water services, recreation and tourism
- Indirect use values: climate regulation, physical protection
- Non-use values: option value (e.g. willingness to pay), presence value (eg value of knowing the existence of a resource)
- Intrinsic Value: Values are not related to human use

Determining the Environmental Benefits Assessed

Ecosystems provide benefits with a wide range of values. However, even in the context of a broad valuation approach, there is a practical and normative dimension for selecting valuable ecosystem services. For example, there is criticism about the frequent failure of valuations to take into account various non-material and non-monetary values (ie religious, relational, cultural, ecological)[16] but there is an ongoing debate about whether non-use values should be prioritized in valuation calculations intended for trial use.[17]

There are also suggestions that valuations can be focused on environmental services with the largest market potential, such as water, ecotourism and carbon stocks.[18] There are also practical considerations, where not all ecosystem services can be measured. Biodiversity, for example, is one of policy priorities, but it is very difficult to measure and evaluate.[19] Defining the environmental services assessed will affect the methods, demands, efforts and costs required.

The use of various economic valuation techniques for all conservation areas is to assist government decision-makers in decision-making related to land management and use However, the conservation authorities of natural and environmental resources and other relevant government departments. However, this still depends on many factors, since natural resource and environmental conservation authorities already have sufficient capacity to undertake such a study.

There are still many opportunities for natural resource and environmental conservation authorities to build synergism between relevant government departments, universities, non-governmental organizations and donors to carry out these economic valuation studies. The relevant government departments usually have data on the value of timber, minerals, agricultural production, drinking water and sanitation. The university has an academic mandate in conducting economic and environmental research. Economists and statisticians can be involved in this activity. Students can become research assistants, and international agencies can provide technical assistance on survey design and interpretation as well as funding for training economists abroad. Non-governmental organizations can assist in disseminating study results to improve public awareness.

The private sector can also play a role in conducting this economic valuation study by providing funds and allowing researchers to conduct research in industrial areas of activity. The private sector may benefit from this study to make informed decisions by taking into account ecological, social, cultural and economic aspects for a longer period of time. Thus, natural resource and environmental management can support the realization of sustainable economic development.

Assessment of damage to environmental damage is essential to science and policy formulation. The valuation of environmental losses can also help to prosecute crimes such as illegal logging, wildlife trade, forest encroachment and corruption. When the offender is found, he / she should be responsible for the damage it causes, andAssessment of loss for environmental damage is essential to science and policy formulation.[20]

The valuation of environmental losses can also help to prosecute crimes such as illegal logging, wildlife trade, forest encroachment and corruption. When the offender is found, they should be responsible for the damage it causes, and the valuation has the potential to strengthen prosecution, prevent potential criminal acts, guarantee compensation to the injured parties, and recover damaged natural resources. One case that describes the valuation of environmental damage is the spillover of Exxon Valdez oil ships along the Pacific coast of the United States in 1989. More countries are trying to measure and assess these impacts to strengthen environmental governance.[21,22]

Environmental valuations have broad implications for the management of forests and natural resources. For example, timber benchmark prices that also take into account ecological values may affect not only the assessment of environmental damage but also affect the tax rate for the timber industry. Valuations can also divert cost-benefit analyzes in ways that can influence decision making on issues such as spatial planning. Critically, valuations can also produce negative consequences.

In rigid financial terms, cost-benefit analysis can support resource extraction rather than conservation or sustainable management.[18] Similarly, the risks that arise when promoting valuation can in fact lead to replacement of ecosystems, where in some contexts environmental losses are then compensated by creating an ecosystem or 'equivalent' elsewhere. This possibility

does not represent a practical or desirable strategy in the context of many tropical forest ecosystems.[23] Thus, there is a need for forward and critical thinking about the valuation implications.

CONCLUSION

1. Exploitation of excessive natural and environmental resources will accelerate extinction, and not support sustainable development. Excessive exploitation can occur because natural and environmental resources are judged only from the side that provides direct economic benefits.
2. Various natural resource and environmental valuation techniques and methods have been developed and used in accordance with the types of resources. Forest resources, for example, do not merely produce timber, but also have the function of providing clean air, flood prevention, and biodiversity. All these benefits if assessed economically have a very high value.
3. It takes the handling of the technical, legal, scientific and political dimensions of the valuations simultaneously, and integrates them into greater efforts to strengthen the management of natural resources and forestry.

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